Journal of International Economics
Volume 60, Issue 1 , May 2003, Pages 223-228
Emperical Exchange Rate Models

doi:10.1016/S0022-1996(02)00043-0 Cite or link using doi

Book review

Barriers to Riches

by Stephen L. Parente and Edward C. Prescott, MIT Press, 2001.

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Available online 21 September 2002.

Article Outline

On the book cover, the title "Barriers to Riches" is aptly sandwiched between two photos of East Asia. The top photo shows farmers planting seedlings in a rice paddy. The bottom photo shows a busy, modern thoroughfare from a thriving metropolis, presumably Hong Kong. The contrast is stark, but it also raises the possibility of a poor, agricultural-based economy transforming into a rich, urbanized, and industrialized one. Indeed, the concluding sentence of Barriers to Riches is "there is no reason why the whole world should not be as rich as the leading industrialized country".

Such boldness percolates throughout this monograph by Stephen L. Parente and Edward C.

Prescott. The boldness begins with the question they address: **Why are differences in per capita income across countries so large?** Parente and Prescott have conducted research on this important topic – surely one of the most central questions in macroeconomics and international economics – for more than a decade. Barriers to Riches is a distillation and synthesis of the product of their research.[1] Academics and policymakers will find Barriers to Riches insightful, thought provoking, and provocative. Any one interested in this question should read this book.

Characteristically, the Parente and Prescott (hereafter PP) thesis is bold: PP first argue that differences in total factor productivity, not differences in capital – no matter how broadly defined – account for differences in output per worker across countries. The second and core part of their thesis begins with the assertion that differences in total factor productivity (TFP) across countries are not due to differing stocks of knowledge. Rather, it is due to *differential access to a worldwide stock of knowledge*. This differential access, in turn, is caused by man-made barriers to technology adoption. Such barriers occur, for example, when industry insiders use their monopoly power to prevent outsiders with superior technologies from entering the industry, and to prevent governments from pursuing more open policies that would lead to greater flows of ideas and trade.

To prove their thesis, PP employ both case study evidence and "quantitative" theory.[2] Each complements the other. The case study evidence is fascinating. The quantitative theory provides rigor and structure. In particular, PP develop a model of total factor productivity centered on industry insiders who put up barriers to technology adoption. This model is the primary contribution of Barriers to Riches.

Following the introductory chapter, PP present key stylized facts on per capita income differences across countries and over time, focusing on the evolving gap between the West and the East, from the Industrial Revolution in the early 19th century through many of the East Asian growth miracles in recent decades.[3] PP argue that an appropriate theory must explain the differences in the timing of modern economic growth, the existence of growth miracles, the failure of the leading countries to experience growth miracles, and the existence of convergence in many countries.

The next three chapters develop the case against differences in capital, and the case for differences in TFP, in accounting for differences in per capita income. Purchasing power parity adjusted per capita income differs by as much as a factor of 30 across countries. PP begin by using the benchmark neoclassical growth model in which capital is interpreted as physical capital. Using a fairly typical capital share of 0.25, they find that changing the economy-wide savings rate from 20 percent to 40 percent would only increase steady-state per capita income by a factor of 1.25. With this model, then, differences in savings rates cannot account for differences in per capita income across countries.

They then address the issue of mismeasured capital. Compared to developed countries, in developing countries investment goods are considerably more expensive than consumption goods. Consequently, the usual measurement techniques may lead to significant overestimates of the capital stock in these countries. If the measures are adjusted for this "bias", then the resulting (increased) variation in capital across countries might account for a significant share of the variation in per capita income. PP find that adjusting for mismeasured capital makes essentially no difference to their benchmark findings. It is worth noting,

however, that their results are in contrast to findings by Chari, Kehoe, and McGratttan (Chari et al., 1997, hereafter, CKM), who also take into account the investment price distortion. One key difference between the two papers is that CKM uses a broader, and hence, larger measure of the capital share – close to 2/3, while PP continue to use their benchmark number of 0.25. Undoubtedly, PP would have found a stronger role for capital differences had they used the CKM parameterization.

PP argue that capital should include any expenditure that is devoted to raising future output, as opposed to current output. Spending on "intangibles", such as expenditures in setting up new enterprises, developing new products, improving the efficiency of existing products, and purchasing software, contribute to an intangible capital stock.[4] PP estimate that investment in intangible capital is equivalent to 50% of measured GDP. By including for this form of capital, the capital share of the U.S. now becomes considerably larger. Moreover, they find that the observed variation in per capita income can be accounted for by a plausible amount of variation in capital. However, they reject this explanation on the grounds that the implied steady-state interest rate on intangible capital in the developing country is too high.[5]

In chapter 5, PP turn to TFP differences. For this exercise, they calibrate the capital share parameter (broadly defined to include both tangible and intangible capital) to the Japanese convergence experience after World War II. They find that a capital share of 2/3 fits the data. When they use this share, and also count capital's endogenous response to TFP as part of TFP's contribution, they find that TFP variation across countries can account for observed per capita income variation.

Two aspects of these exercises seem puzzling. The first is that different capital share parameters are used in the different exercises. Why not use the same physical capital+intangible capital share in all the exercises? The second is the fact that in the TFP accounting exercises, PP allow for capital to efficiently evolve in response to TFP. But the framework they develop in the later chapters is one in which TFP is far from optimal levels, suggesting the possibility that capital could also deviate quite significantly from optimal levels! Nevertheless, the main conclusion from these chapters – that variation in observable measures of physical and human capital cannot account for variation in per capita incomes across countries – conforms to the results of most of the other key research in this literature.[6]

Chapters 6 through 8 then lay out the key PP thesis that understanding man-made barriers to technology adoption is the key to understanding income differences across countries. These three chapters constitute the main contribution of Barriers to Riches. PP first introduce a plant level production function, inclusive of barriers, and then they aggregate it up to the standard neoclassical production function. In so doing, they show how barriers do not need to be large to generate large TFP and per capita income differences.

In chapter 7, they draw from existing case studies on the textile, sub-surface mining, and other industries to study the nature of the barriers to production. The contrast between the Indian and Japanese textile industries is especially striking. Between 1920 and 1938, productivity growth in the Japanese mills was three times faster than that in the Indian mills. This was due to an environment in Japan that facilitated changing work practices so that each worker could have more mills to work with. These case studies lead PP to conclude that constraints on work practices and on technology adoption are the most important reasons for the differences in TFP across countries.

For further case study evidence, I would suggest a comparison of Calcutta (Kolkata) to Bombay (Mumbai) during the last half-century. On the eve of the partition of the Indian sub-continent into Pakistan and India in 1947, the crown jewel of Britain's South Asian Empire was Calcutta. Over the next several decades, Bombay grew considerably in a wide range of industries, and is now significantly richer than Calcutta. Many observers have attributed the decline of Calcutta to numerous union strikes and work stoppages.

In chapter 8, PP present a model of workplace constraints cast in the dynamic general equilibrium framework common to the "Minnesota" approach to macroeconomics. It is a rich, complex model with household, farming, and industrial sectors. The latter sector is where industry insiders, i.e., suppliers of factors, use their monopoly power to put up barriers to technology adoption. They form coalitions and dictate work practices that essentially govern the productivity of the industry. The industry also has outsiders who are potential entrants; these entrants possess a newer and more productive technology. However, entrants must invest resources proportional to the size of the insiders' coalition to overcome resistance to adopting the new technology.

The interaction between industry insiders and outsiders is modeled as a multi-stage game. In the first stage, insiders decide whether to stay or to go to another sector. In the second stage, outsiders decide whether to make the investment to overcome resistance by insiders. The third stage involves the pricing decisions by the market participants. PP develop the necessary conditions for a no-entry steady-state equilibrium to occur. They contrast a calibrated version of this model with a calibrated free-entry model and find that the elimination of barriers to entry would lead to an almost tripling of output. This certainly adds up to a lot of Harberger triangles!

The theory is quite compelling. But for it to be truly persuasive, more careful empirical studies are needed. Fortunately, several such studies have recently appeared. Two notable ones are by Cole and Ohanian (2001) and by Schmitz (2001). The papers demonstrate the importance of increased workplace restrictions on the slow U.S. recovery from the Great Depression, and of more flexible workplace conditions on the recent surge in productivity in the U.S. iron-ore industry.

Barriers to Riches concludes with a brief discussion of why some countries entered into sustained growth paths centuries ahead of other countries. PP also offer a set of broad policy prescriptions, including promoting competition, free trade, and privatization. The authors argue that these policies would help set into place institutional arrangements and systems where insiders would find it considerably more difficult to obtain and use monopoly power to dictate work practices.

Today's world is a world where high school students in India study from essentially the same math and science textbooks as in the U.S. or the U.K. Parente and Prescott give substance to observations like this by making a compelling case that the key to understanding the differences in per capita income across countries is in understanding the man-made barriers to technology adoption. Their idea is not new, as the authors indicate in the introduction. But, they are the first to embed the idea in a dynamic general equilibrium model, so the full dynamic and aggregate implications of man-made barriers can be investigated.

One final point. The Parente-Prescott thesis is pursued in a closed economy framework.

However, many of the man-made barriers that the authors refer to are quite plausibly barriers to international trade and "ideas". It seems that to truly develop a theory of TFP differences an open economy framework is needed. Indeed, all of the growth miracle countries in the last half-century opened up to trade and ideas to varying extent. Moreover, several of these countries are now contributing to the world stock of knowledge in some industries. A framework that marries elements of Grossman and Helpman's (1991) open economy endogenous growth framework with the one here might be a good direction to extend Parente and Prescott's profound contribution to our knowledge of income differences across countries.

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[1] The monograph was originally presented as the Walras-Pareto lectures at the Universite de Lausanne in 2000.

[2] Prescott is famous, of course, for making the quantitative theory, or "calibration", approach an important part of the methodology of modern macroeconomics.

[3] The East is defined as Asian countries with populations greater than 100 million, as well as Burma, Philippines, South Korea, Taiwan and Thailand.

[4] Some of these activities, which PP want to count as contributions to intangible capital, might also be thought of as contributions to TFP. The distinction between capital and TFP becomes more blurred.

[5] PP also include for human capital, and, like Hall and Jones (1999) and in Klenow and Rodriguez-Clare (1997), (but unlike Mankiw et al. (1992)), they conclude that capital differences still cannot account for per capita income differences across countries.

[6] See references in [5], as well as King and Levine (1994).

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